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An electrical supply rail system for a room to provide access to power and signals at any selected location therein, and comprising an electrical supply rail (10)(11) for fixture as a skirting board to the walls of the room, and electrical branching devices (36) for plugging into the supply rail where desired, the supply rail having at least one access channel (14) formed in the front face of the rail, a plurality of overhead vertical spaced passages (21) communicating with the roof (17) of the channel (14) and bus-bars (23) fixed in side wall of the passages (21) and each of the electrical branching devices (36) being connectable to an electrical appliance and having a stem (40) with at least one radial tine (39) thereon for engagement with at least one of the bus-bars (23) when the branching device (36) is inserted and rotated with respect to the channel (14).

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"ELECTRICAL SUPPLY RAIL SYSTEM"

TECHNICAL FIELD

This invention relates to electrical supply rail systems, and more particularly to supply rails intended for
5 installation about the walls of a room and accessible at almost any selected position for take-off of electrical power and/or signals.

BACKGROUND ART

Overhead spot and track lighting installations utilise
10 a form of channelled power supply railing into which hanging fittings are plugged at selected positions. Power engagement for a fitting is effected by insertion of a plug into the track channel and twisting through 90°. Examples of such devices can be found in U.S. Patent Specifications Nos.
15 4,217,018 and 3,639,885, and Australian Patent No. 465,798. In all these instances electrical conductors are provided to either side of an entrance slot and in view of the elevated position of this rail no special safety precaution is taken, for instance against prying children.

20 Other rails, or ducts, for supply of electrical power, lighting etc. has been proposed for installation in a low-down position, see for example published Australian Patent Specification No. 70863/74, German Patent No. 2,002,419 and French Patent 1,198,282, but in each instance
25 the equipment is too hazardous for use in positions reached by children due to the exposed nature of the conductors, and the recesses in the rail for housing conductor bars are not proof against any liquid likely to be dispersed in the surrounding area.

DISCLOSURE OF THE INVENTION

30 It is the main object of the invention to provide an electrical supply rail, and system, which is safe and effective for use in low-down positions within rooms.

To this end, the invention provides an electrical
35 supply rail for fixture to an upright mount such as a wall of a room, said supply rail comprising an elongated body having a rear face for juxtaposing to said wall with a front face directed into said room, at least one longitudinally

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extending channel in said body having an exposed mouth at said front face thereof and including a substantially horizontal floor, a roof and an inner end, and a plurality of longitudinally extending overhead substantially vertical passages in said body and communicating with said channel through the roof thereof, and an electrical conductor bar extending along and affixed to one side wall of at least one of said passages, whereby take-off of electrical power, or signals, from said conductor bar is effected by insertion into said channel of a plug having at least one tine and then twisting to engage the tine with said conductor bar.

The invention also provides an electrical supply rail system for installation in at least one room of a building and comprising an electrical supply rail for fixture to a support, such as a wall of the room, and at least one electrical branching device detachably connected to said supply rail at a selected position for providing at said position access to the electrical power, or signals, conveyed in said supply rail;

said supply rail comprising an elongated body having a rear face for juxtaposing to said wall with a front face directed into said room, at least one longitudinally extending channel in said body having a mouth exposed at said front face thereof and including a substantially horizontal floor, a roof and an inner end, and a plurality of longitudinally extending overhead substantially vertical passages in said body and communicating with said channel through the roof thereof, and an electrical conductor bar extending along and affixed to one side wall of at least one of said passages; and

said electrical branching device comprising means for electrical connection to an appliance, a stem portion, at least one tine carried radially upon said stem and providing for electrical interconnection between said conductor bar and said electrical connection means for the appliance when said stem portion is inserted into said channel with the tine disposed substantially horizontal and said device is then twisted to engage the tine with the conductor bar.

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BRIEF DESCRIPTION OF DRAWINGS

The invention will be described in more detail with reference to the accompanying drawings, in which:

5 Fig. 1 shows in perspective a first embodiment of an inflexible electrical supply rail constructed according to this invention and shown traversing an inside corner of a room;

Fig. 2 shows a typical corner piece that may be used therewith;

10 Fig. 3 shows a fragment of the supply rail to an enlarged scale;

Figs. 4, 4A and 4B show an end elevation of the supply rail of Fig. 3, and enlarged details thereof;

15 Fig. 5 is a perspective view of another embodiment of a flexible electrical supply rail shown forming part of a skirting board extending around two corners of a room;

Fig. 6 is a transverse section through a skirting board incorporating an electrical supply rail of this invention;

20 Fig. 7 is a side elevation of an electrical branching device that may be utilised with the electrical supply rail shown in Fig. 6;

Fig. 8 is a transverse section through the electrical supply rail with the branching device inserted;

25 Fig. 9 is a similar view with a telephone plug inserted into the electrical supply rail; and

Fig. 10 is a similar view of a different form of electrical supply rail.

MODES FOR CARRYING OUT THE INVENTION

30 As shown in Figs. 1 to 4, the electrical supply rail system of the invention consists of substantially inflexible elongated sections 10 and 11 which may serve entirely as a skirting board for a room. The sections 10 and 11 are preferably composed of plastics material and are angularly disposed at a corner of the room and interconnected by a
35 corner piece 12 having sets of prongs 13A, 13B and 13C which provide electrical conduction through the piece 12 and fasten the sections 10 and 11 together. Each section 10 or 11 has at least one longitudinally extending channel 14A, 14B or 14C

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which by the invention is composed of a horizontal slot 15 having a flat floor 16 which may be horizontal, but preferably has a slight fall towards the front face 10A, or 11A, of the respective section. Each channel 14A, 14B or 14C also has a roof 17 and an inner end 18 and has an exposed mouth at the front face, 10A or 11A, of the section 10 or 11. A rear face 19 is juxtaposed to the wall 20. A plurality of longitudinally extending overhead, substantially vertical, spaced passages 21 communicate with and extend upwardly through the roof 17 of each channel 14. The roof 17 is located within a lateral recess 22 in each slot 15. Near the upper end of at least some of the passages 21 electrical conductor bars 23, shown more clearly in Fig. 4A are embedded in the side wall 24 of the passage 21. The bars 23 extend longitudinally for the length of the section 10 and are composed of copper strips, or other electrically conductive material, embedded by their longitudinal edges 23A. Preferably the inlet end of each passage 21 is provided with a flexible restriction 24 shown in Fig. 4B. The restriction 24 may be formed as a feather edge in the moulding of the section 10 or 11. It will be appreciated by this construction of the sections 10 and 11 that the electrical conductors 23 are well concealed within the body of the electrical supply rail section 10 or 11 and are secure against prying children. Furthermore, in the event of liquids being splashed, or being dispensed, in the neighbourhood of the rail so that they might enter any one of the channels 14, the liquid will drain from the slot 15 without affecting the function of the rail or the creation of a hazardous condition.

Another form of electrical supply rail 25, which is flexible, is shown in Figs. 5 and 6. It may be composed of extruded flexible thermoplastic material with flexible conductor bars 26 embedded therein during extrusion, or deposited subsequent thereto. When so formed the rail 25 may be bent around outside or inside corners 27 and 28 of walls 20 and form only a central portion of a skirting 29. An upper timber beading 30 and a lower mitred kick plate 31 may

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complement the rail 25. Outside, or inside, corner pieces 32 and 33 may be clipped over the rail 25 at the corners 27 and 28 for enhanced appearance. A strip of flexible cover insert 34 may be press fitted into the channel 14 of this, or the previous, embodiment for added security. A gap 35 will be made in the insert 34 for the insertion of an electrical branching device 36, to be described hereafter. The rail 25 may be secured to the wall 20 by nails, or screws, at the points 37 shown in Fig. 6.

The rail 25 of this embodiment has two channels 14A and 14B, with the former provided with two passages 21. It will be noted that the conductor bars 26 are positioned within grooves 38 located on those side walls of the passage 21 which lie closest to the front face 25A of the rail 25. This affords even more safety to the system. The channel 14A may serve for supply of mains power. The latter channel 14B has a peaked roof 17 with separate conductor bars 26 and may serve for the supply of telephone signals in a manner described hereafter.

For take-off of electrical signals, or power, from either of the above supply rails an electrical branching device, such as power sockets 36 similar to those shown in Figs. 1, 5, 7 and 8, may be utilised. It is to be understood that the term "electrical branching device" is intended to mean either an electrical power socket into which appliances may be plugged, or the appliance plug itself or any other form of device by which electrical power, or signals can be applied to an appliance or electrical fitting. The sockets 36 shown are designed for insertion within a channel 14 and may have two or more tines, or prongs, 39 radially extending from an axial stem 40. The stem 40 is hollow to house at its distal end 41 a button 42 depressible against the action of an internal helical spring 43 (Fig. 8). The head 44 of the socket 36 is provided with independent terminals 45 electrically connected to the tines 39 which serve as conductive wipers.

When the stem 40 of the socket 36 is inserted into the channel 14A as shown in Fig. 5, the end of the button 42

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engages with the inner end 18 of the slot 15. To enable such insertion of the stem 40 the socket is positioned so that the tines 39 are longitudinally aligned with the channel 14A, i.e. horizontal, and by depression of the socket 36 against the spring action of the button 42 the tines 39 may be brought into alignment with respective ones of the passages 21. Thereupon with rotation of the socket 36 through 90° the tines 39 can be caused to engage with the electrical conductor bars 26 as shown in Fig. 8. Through the resiliency of the button 42 the tines 39 are caused to bear with force upon the conductor bars 26 for good electrical contact. As shown in Fig. 8 an earth bus 46 is incorporated at the end 18 of the channel 14 and one of the electrical connecting leads 47 to the terminals 45 of the socket is wired to a conductive cap on the button 42 while the remaining leads 47 are wired to the inner ends of the tines 39. Axial displacement of the socket 36 when inserted is resisted by the lateral enlargement 48 on the stem 40 which is accommodated within the recess 22 of the channel 14.

The three channels 14A, 14B and 14C shown in Figs. 1, 3 and 4 may be utilised for the supply, respectively, of mains power, telephone and stereophonic audio signals. More or less channels may be incorporated within a supply rail, and other forms of electrical signals may be conveyed thereby.

Furthermore, as shown in Fig. 10 the supply rail may comprise only a single channel 14 with each of the passages 21 mounting a plurality of conductor bars 26 relevant to a respective function. For example, one passage 21 may provide conductor bars 26 for supply of telephone connection, a second one may supply through four connector bars 26 stereophonic audio signals, while a third passage 21 may comprise two conductor bars 26 for supply of television signals. However, a separate channel 14 will usually be required for the supply of electric mains power. To effect connection to such conductor bars 26 a different method of plugging in will be required depending upon the form of signal required for take-off. As described in connection with the above embodiment only a single tine 39 will be

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provided on any socket 36, or plug, which will be composed of electrically conductive material wired to respective terminals 45 of the socket 36 for contact with appropriate ones of the conductor bars 26 in any passage 21. In the form shown in Fig. 10 the tines 39 will preferably be hollow and no-conductive with electrical contacts fixed along their lengths and having individual connecting leads 47. It will be noted that in the various forms described above, the conductor bars 18 are in each instance provided upon one wall only of a respective passage 17. The embodiment of Fig. 10 is ideal for conveying many pairs of telephone leads in a commercial area. Each telephone will be provided with a plug having a pair of tines 39 to connect to an individual predetermined pair of conductor bars 26.

As explained above the electrical branching device 36 may be a plug permanently wired to an appliance, or fitting, and an embodiment of this form is shown in Fig. 9. For plugging in of a telephone to the channel 14B of Fig. 6 the plug 49 may be used. It includes a hollow stem 50 with a lateral aperture 51 closed by a cap 51 urged outwardly by a helical spring 52 to engage with the conductor bars 26 when the plug 49 is fully inserted and are connected by leads 47 to the telephone (not shown). Due to the restricted entry to the channel 14B the cap 52 will be depressed against the spring 52 as the plug 49 is inserted.

Whereas several embodiments have been described in the foregoing passages it should be understood that other forms, refinements and modifications are feasible within the scope of this invention.

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CLAIMS

1. An electrical supply rail for fixture to an upright mount such as a wall of a room, said supply rail comprising an elongated body having a rear face for juxtaposing to said wall with a front face directed into said room, at least one longitudinally extending channel in said body having an exposed mouth at said front face thereof and including a substantially horizontal floor, a roof and an inner end, and a plurality of longitudinally extending overhead substantially vertical passages in said body and communicating with said channel through the roof thereof, and an electrical conductor bar extending along and affixed to one side wall of at least one of said passages, whereby take-off of electrical power, or signals, from said conductor bar is effected by insertion into said channel of a plug having at least one tine and then twisting to engage the tine with said conductor.

2. A electrical supply rail according to claim 1, wherein said one wall is on that side of the passage closest to the front face of the body.

3. An electrical supply rail according to claim 1 or 2, wherein said roof is provided on a lateral recess in said channel.

4. An electrical supply rail according to any one of the preceding claims, wherein said conductor bar is accommodated within a groove in the side wall of said passage.

5. An electrical supply rail according to any one of the preceding claims, wherein an earthing bus is provided at the inner end of said channel.

6. An electrical supply rail according to any one of the preceding claims, further comprising a flexible cover insertable within said channel to cover said mouth.

7. An electrical supply rail system for installation in at least one room of a building and comprising an electrical supply rail for fixture to a support, such as a wall of the room, and at least one electrical branching device detachably connected to said supply rail at a selected position for providing at said position access to the

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electrical power, or signals, conveyed in said supply rail;
said supply rail comprising an elongated body having a rear face for juxtaposing to said wall with a front face directed into said room, at least one longitudinally extending channel in said body having a mouth exposed at said front face thereof and including a substantially horizontal floor, a roof and an inner end, and a plurality of longitudinally extending overhead substantially vertical passages in said body and communicating with said channel through the roof thereof, and an electrical conductor bar extending along and affixed to one side wall of at least one of said passages; and

said electrical branching device comprising means for electrical connection to an appliance, a stem portion, at least one tine carried radially upon said stem and providing for electrical interconnection between said conductor bar and said electrical connection means for the appliance when said stem portion is inserted into said channel with the tine disposed substantially horizontal and said device is then twisted to engage the tine with the conductor bar.

8. An electrical supply rail system according to claim 7, wherein the body of the supply rail is formed from flexible plastics material.

9. An electrical supply rail system according to claim 7 or 8, wherein said channel has a lateral recess, and said electrical branching device has a lateral enlargement on its stem engageable within said recess when said device is operatively inserted within said channel thereby to restrain axial movement of the device.

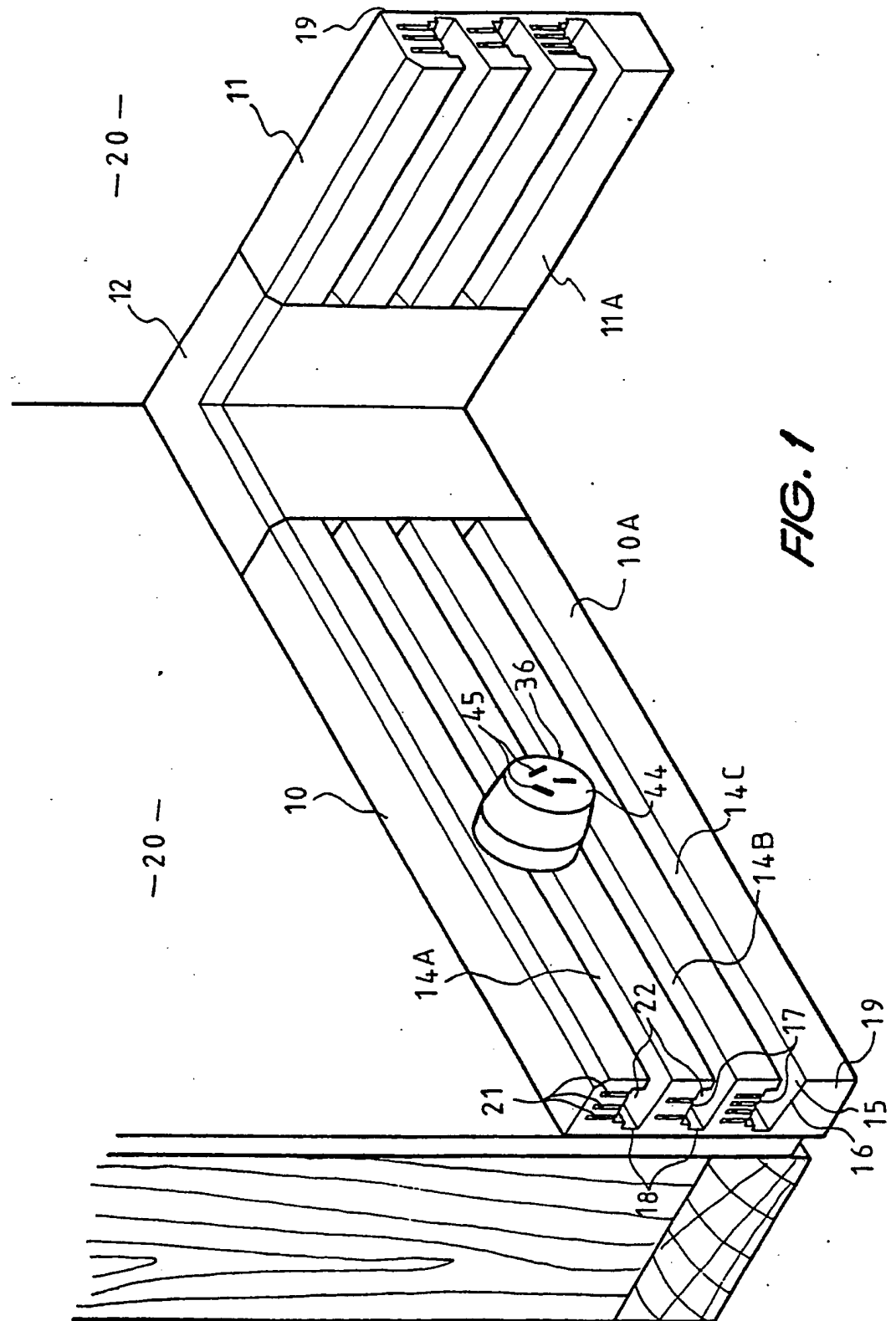
10. An electrical supply rail system according to any one of claims 7 to 9, wherein said mouth of the channel is closable by a flexible strip insertable within the mouth.

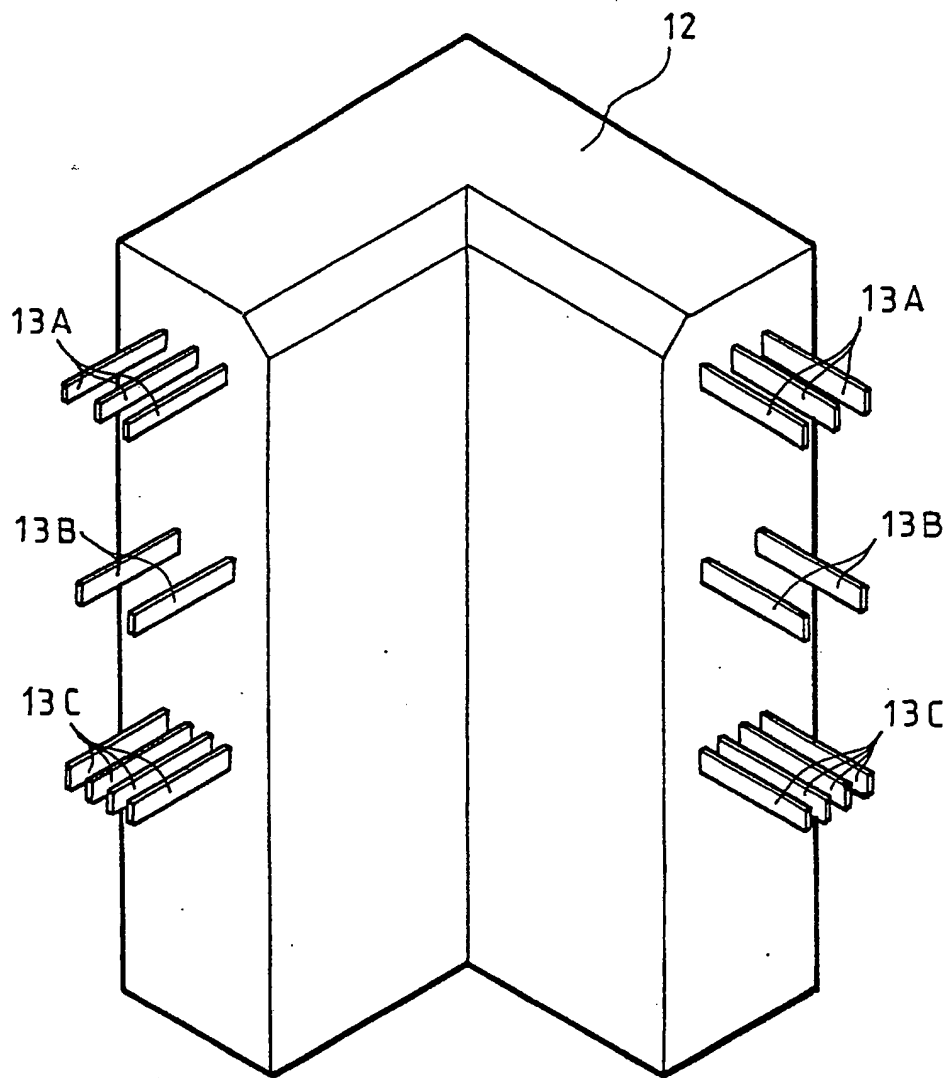
11. An electrical supply rail system according to any one of claims 7 to 10, wherein a second channel is provided within the body and has a peaked roof supporting a pair of telephone conductors, and includes a telephone plug insertable into said second channel, said plug having a stem with a lateral aperture and a cap carrying terminals and

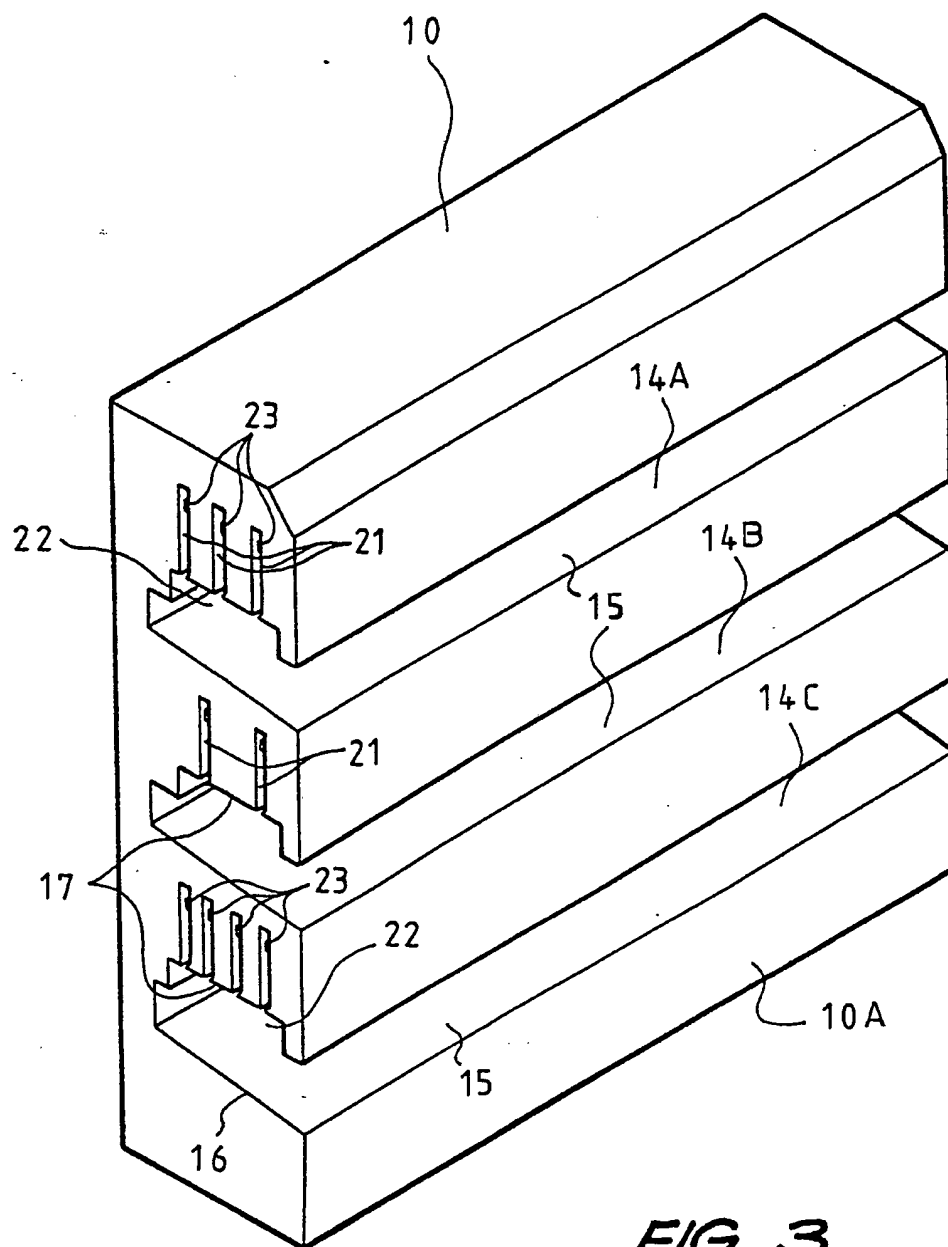
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being spring urged radially outward to engage said terminals with said telephone conductors when the plug is axially inserted into the channel.

12. An electrical supply rail system according to any one of claims 7 to 10, wherein a plurality of channels are provided in the body each for conveying a different form of electrical signal, and wherein the electrical branching device for use with any one of said channels differs in construction from the branching devices for use with the remaining channels.



**FIG. 2**

**FIG. 3**

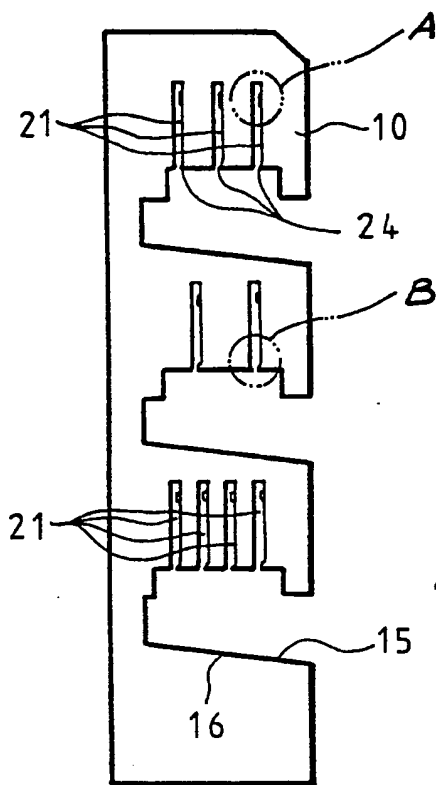


FIG. 4

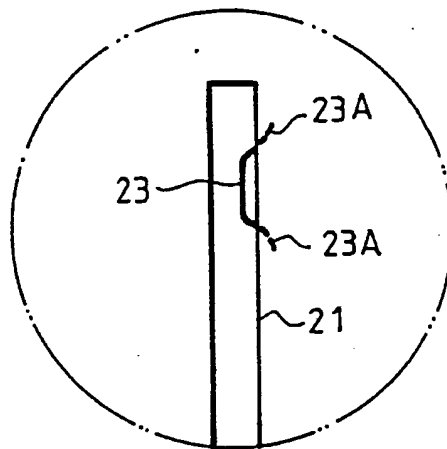


FIG. 4A

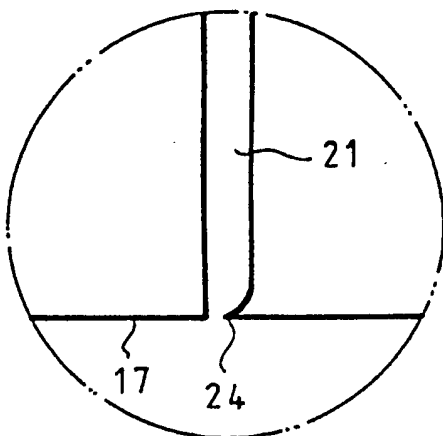


FIG. 4B

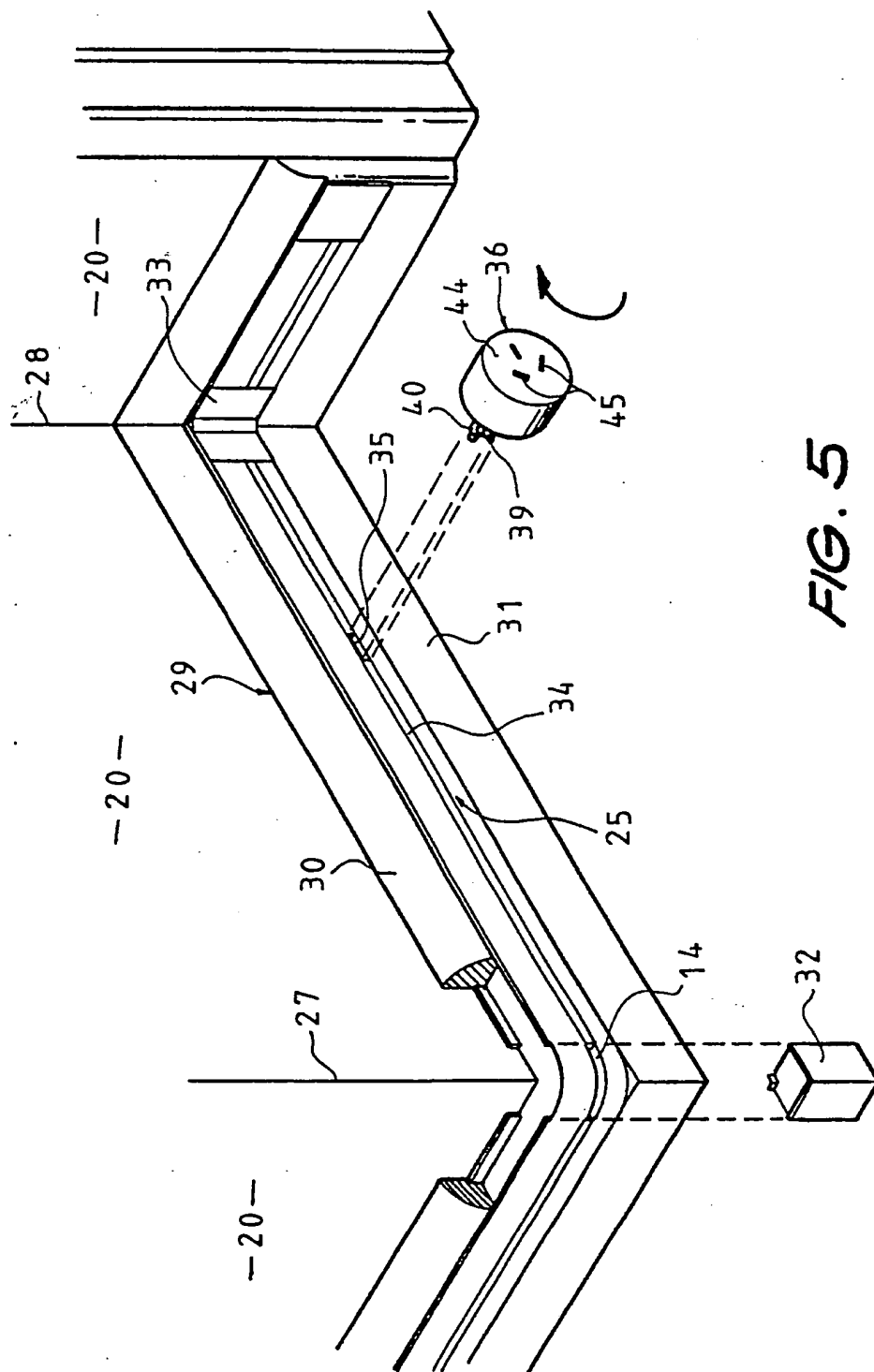


FIG. 5

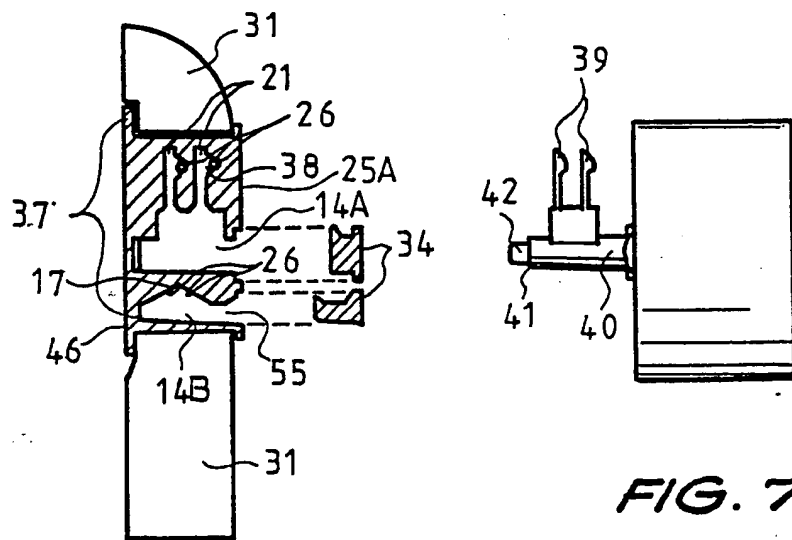


FIG. 7

FIG. 6

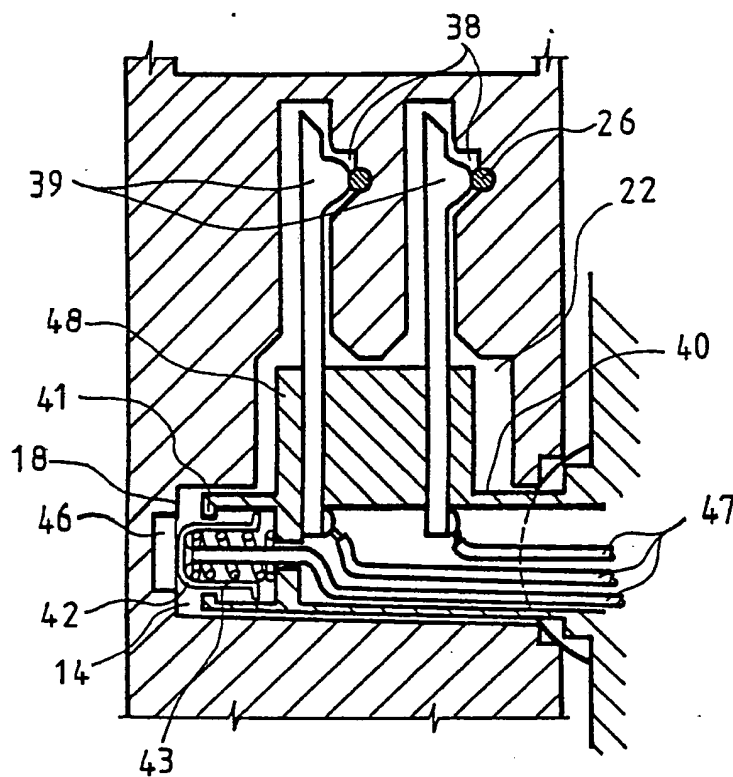


FIG. 8

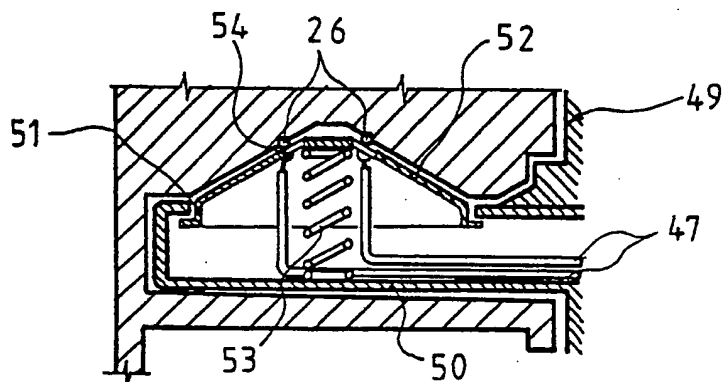


FIG. 9

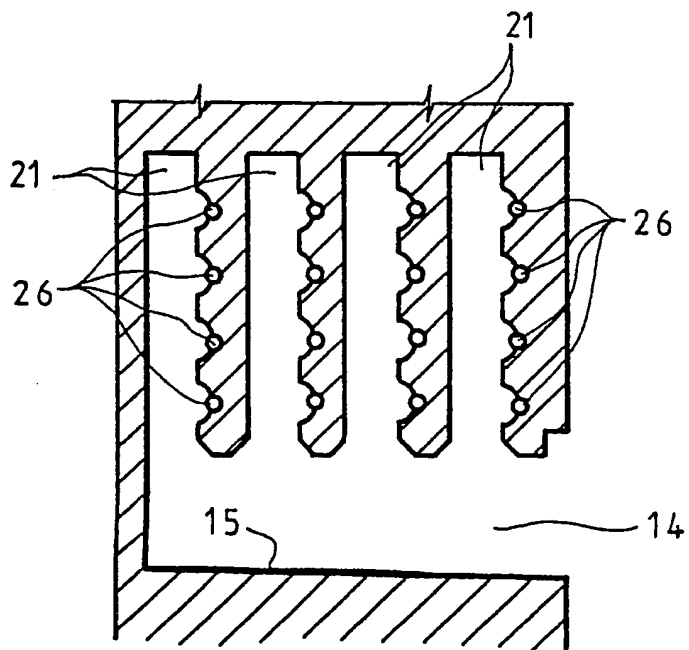


FIG. 10

INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 86/00252

I. CLASSIFICATION OF SUBJECT MATTER (1) Several classification symbols apply indicate all ⁴		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ H02G 5/04, H01R 25/14		
II. FIELDS SEARCHED		
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Classification System	Classification Symbols	
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AU; IPC as above, Australian Classification 03.3001		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No ¹³
X	AU,A, 76708/81 (ELECTRAK INTERNATIONAL LTD) 6 May 1982 (06.05.82) See page 21	(1,6)
X	AU,B, 32936/71 (455076) (CULSHAW G.V.) 8 March 1973 (08.03.73) See pages 8-9	(1,3,5,6,7,8,10)
X	AU,B, 58010/69 (423656) (THORN LIGHTING LIMITED) 21 January 1971 (21.01.71) See page 5	(1,3)
X	GB,A, 2149230 (HANKIN J.I.) 5 June 1985 (05.06.85) See whole document	(1,2,4,5,7,8)
X	GB,A, 2093642 (COMANDULI, P.) 2 September 1982 (02.09.82) See whole document	(1)
A	GB,A, 2067363 (MATSUSHITA ELECTRIC WORKS LTD) 22 July 1981 (22.07.81) See whole document	
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
31 October 1986 (31.10.86)		(13.11.86) 13 NOVEMBER 1986
International Searching Authority		Signature of Authorized Officer
Australian Patent Office		N.C. PETERSEN

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 86/00252

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Members			
AU 76708/81	CA 1171479 HK 522/85	EP 51951 JP 57103276	GB 2087168 US 4479687	
AU 58010/69	GB 1169318	US 3546367		
GB - 2149230	GB 8426175	ZA 8408105		
GB 2093642	DE 3206045	FR 2500224		
GB 2067363	DE 3048828 JP 56125714	JP 56096475	JP 57000010	

END OF ANNEX